Amendments to the Claims

The following listing of the claims replaces all prior listings.

1. (Cancelled)

2. (Cancelled)

3. (Previously Presented) The method of claim ~~2~~ 10 wherein sufficient fuel and oxygen are combusted in the regeneration cycle to generate a regeneratively cooled flue gas exiting the reformer at a temperature in the range of about 300°C to about 600°C.

4. (Cancelled)

5. (Cancelled)

6. (Cancelled)

7. (Cancelled)

8. (Original) The method of claim 7 including recycling a portion of the flue gas to the pressure swing reformer during the regeneration cycle.

9. (Previously Presented) The method of claim ~~1~~ 10 wherein the oxygen in the regeneration cycle is provided as compressed air from a gas turbine.

10. (Previously Presented) A method for producing high pressure hydrogen comprising:

(a) passing a feed stream under high pressure conditions and comprising a hydrocarbon and stream through a first zone containing packing materials and a

steam reforming catalyst at an elevated temperature to produce a high pressure synthesis gas stream;

(b) passing at least a portion of the synthesis gas stream of step (a) through the first end of a second zone containing bed packing materials at a temperature lower than the first zone thereby transferring sensible heat from the product to the packing material in the second zone and providing a high pressure synthesis gas at a temperature approaching that of the packing material at the second end;

said steps (a) and (b) being conducted at a space velocity C_1GHSV of at least 1000 hr^{-1}, and a heat transfer parameter ΔT_{HT} between about 0.1°C and 500°C, and at conditions sufficient to provide a regeneratively cooled synthesis gas at said second end of said second zone in the range of about 220°C to about 400°C;

(c) removing substantially all of the high pressure synthesis gas from the second zone and introducing said gas into a high temperature water-gas shift reaction zone to provide a gas stream enriched in hydrogen;

(d) passing the hydrogen enriched gas stream through a hydrogen separation zone to separate high pressure hydrogen;

(e) removing high pressure hydrogen from the separation zone;

(f) introducing a mixture of a fuel and an oxygen containing gas, at a pressure lower than in step (a) into the second end of the second zone for combustion and passage through said second and first zone thereby heating the first zone to reforming temperatures and creating a regeneratively cooled flue gas which exits through the first end of the first zone.

11. (Original) The method of claim 10 wherein the hydrogen separation zone is a pressure swing adsorption zone whereby substantially all of the components of the product gas stream other than hydrogen are adsorbed.

12. (Original) The method of claim 11 wherein the high pressure conditions are in the range of about 10 to about 100 bar.

13. (Currently Amended) The method of claim 12 including purging the pressure swing adsorption zone to provide a purge gas stream and introducing at least a portion of the purge gas stream as the fuel in step ~~(e)~~ (f).

14. (Previously Presented) The method of claim 13 wherein the regeneration is conducted under conditions sufficient to provide a flue gas having time-average temperature range of about 400°C to about 500°C and the regeneratively cooled flue gas is passed through a heat exchanger to generate steam for reforming step (a).

15. (Original) The method of claim 14 wherein at least part of the flue gas passed through the heat exchanger is recycled to the second end of the second zone during regeneration.

16. (Original) The process of claim 10 wherein the oxygen containing gas of step (f) is provided as compressed air from a gas turbine.

17. (Original) The method of claim 10 wherein the packing material of said first and second zones are composed of materials selected from the group consisting of magnesium aluminum silicates, aluminum silicate clays, millite, alumina, silica-alumina, zirconia and mixtures thereof.

18. (Cancelled)